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ART UNIT	**PAPER NUMBER**
2143	14

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/384,699	TZENG ET AL.	
	Examiner	Art Unit	
	George C Neurauter, Jr.	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-28 have been examined.

Response to Arguments

2. Applicant's arguments filed 27 April 2004 have been fully considered but they are not persuasive.

In regards to Applicant's argument that "Scalable Atomic Multicast" ("SAM") does not teach wherein the first quantity of requests to assign a first sequence number to a first data message being other than a majority or a non-majority of requests from the data servers, the Examiner does not agree. "SAM" discloses within the references made the previous Office Action wherein a "qualified majority" invokes the assigning of a sequence number. "SAM" discloses:

> "...[W]e define a qualified majority of Dst(m)... as any subset of Dst(m) that contains a majority of processes of every group g_i in Dst(m). For example, if Dst(m) = $\{g_1, g_2\}$, g_1 = {p1, p2, p3} and g_2 = {p4, p5, p6}, then {p1, p2, p4, p5} is a qualified majority of Dst(m), whereas {p1, p2, p3, p4} is not." (pages 4 and 5, "Qualified Majority")

In claim 1, the Examiner interprets the claim wherein only one group of data servers or "processes" exists within the scope of the claim, as further shown in claim 1, which reads "A method for multicasting data messages to members of a multicast group". In this case, if there were two data servers or "processes" in one group in the case of the disclosures of "SAM", only one process would need to send a request to assign a sequence number to fulfill the "qualified majority" limitation. This interpretation

is supported by the claim wherein the claim reads "...the multicast group comprising...one or more data servers". Therefore, "SAM" does teach wherein the first quantity of requests being other than a majority of requests or a non-majority from the data servers as amended and is within the scope of the claims as amended.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-28 are rejected under 35 U.S.C. 102(a) as being anticipated by "Scalable Atomic Multicast" ("SAM").

Regarding claim 1, "SAM" discloses a method for multicasting data messages to members of a multicast group, the multicast group comprising a sequencer (referred to throughout the reference as "process" or "sequencer"; page 6, right column, paragraph beginning "Sequencer-site algorithms"), one or more clients (referred to throughout the reference as "sender"), one or more data servers (referred to throughout the reference as "group member" or "addressees" or "processes"), and one or more commit servers (referred to throughout the reference as "processes"), the method comprising the steps of:

transmitting a first data message to the members of the multicast group; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 1; page 4, Figure 4, step 1; page 5, right column, paragraph beginning "1. Dissemination step")

each data server that receives the first data message requesting the sequencer to assign a first sequence number to the first data message, the first sequence number being from a sequence of numbers allocated to the data messages, said first sequence number following all sequence numbers assigned prior to assignment of the first sequence number (referred to throughout the reference as "Uniform Total Order", particularly in Table 1 on page 4); assigning the first sequence number to the first data message, in response to the sequencer receiving a first quantity of the requests to assign a first sequence number to the first data message said first quantity of requests being other than a majority of requests from the data servers; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

notifying the commit servers of the assignment of the first sequence number to the first data message; each of the commit servers sending to the sequencer an acknowledgment of the notification of the assignment of the first sequence number to the first data message, in response to being notified of the assignment of the first sequence number to the first data message; committing the first sequence number to the first data message, in response to the sequencer receiving a second quantity of the acknowledgments of the notification of the assignment of the first sequence number to the first data message; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 4; page 5, Figure 4, step 4; pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step") and

informing the members of the multicast group of the commitment of the first sequence number to the first data message. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

Regarding claim 2, "SAM" discloses a method according to Claim 1, wherein said step of each data server that receives the first data message requesting the sequencer to assign a first sequence number to the first data message includes the step of sending, from said each data server that receives the first data message to the sequencer, a data report message identifying the first data message; (referred to throughout the reference as "R-deliver(m)"; page 5, Figure 4, step 2, specifically the line "when [R-deliver$_j$(m)]")

said step of notifying the commit servers of the assignment of the first sequence number includes the step of submitting to the commit servers a commit submit message identifying the first data message; (referred to throughout the reference as "history(p)"; page 5, Figure 4, step 4, specifically the line "send history(p_j) to local group")

said step of sending to the sequencer an acknowledgment of the notification of the assignment of the first sequence number includes the step of sending to the sequencer a commit acknowledge message identifying the first data message; (referred to throughout the reference as "history(p, SN(m))"; page 5, Figure 4, step 5, specifically the line "when [history(p_k, SN(m)) received from a majority of local group"; page 6, left column, paragraph beginning "Let history(p_i, n) denote the subset...") and

said step of informing the members of the multicast group of the commitment of the first sequence number includes the step of sending a commit message identifying the first data message to the members of the multicast group. (referred to throughout the reference as "deliver-in-order(SN(m), PPS(m))")

Regarding claim 3, "SAM" discloses a method according to Claim 2, further comprising the step of transmitting a second data message to the members of the multicast group, wherein said step of sending, from said each data server that receives the first data message to the sequencer, a data report message identifying the first data message further includes the step of a first data server sending a first data report message identifying the first data message to the sequencer after said first data server receives the second data message, said first data report message also identifying the second data message. (referred to throughout the reference as "R-deliver(m)" and "gossip"; page 5, left column , paragraph beginning "The sequence of pairs..."; page 5, right column, paragraph beginning "2. Timestamp dissemination"; page 6, footnote #5)

Regarding claim 4, "SAM" discloses a method according to Claim 2, further comprising the steps of transmitting a second data message to the members of the multicast group; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 1; page 4, Figure 4, step 1; page 5, right column, paragraph beginning "1. Dissemination step")

each data server that receives the second data message requesting the sequencer to assign a second sequence number, the second sequence number being from the sequence of numbers allocated to the data messages, said second sequence

number following all sequence numbers assigned prior to assignment of the second sequence number (referred to throughout the reference as "Uniform Total Order", particularly in Table 1 on page 4), to the second data message, said step of each data server that receives the second data message requesting the sequencer to assign a second sequence number to the second data message, includes the step of sending from said each data server that receives the second data message to the sequencer a data report message identifying the second data message; (referred to throughout the reference as "R-deliver(m)" and "gossip"; page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step"; page 5, left column, paragraph beginning "The sequence of pairs..."; page 5, right column, paragraph beginning "2. Timestamp dissemination"; page 6, footnote #5)

assigning the second sequence number to the second data message, in response to the sequencer receiving a third quantity of the requests to assign a second sequence number to the second data message; wherein said step of notifying the commit servers of the assignment of the first sequence number further includes the step of notifying the commit servers of the assignment of the second sequence number, said commit submit message identifying the first data message also identifying the second data message. (referred to throughout the reference as "history(p)" and "gossip"; page 5, Figure 4, step 4, specifically the line "send history(p_j) to local group"); page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3;

page 5, left column, paragraph beginning "The sequence of pairs..."; page 6, footnote #5; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

Regarding claim 5, "SAM" discloses a method according to Claim 2, wherein the members of the multicast group deliver the data messages to their respective upper layer applications in order of progressing sequence numbers, further including the step of using a receiver driven, negative acknowledgment based approach to improve reliability of delivery of the data messages. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

Regarding claim 6, "SAM" discloses a method as in any one of Claims 1-5, wherein said data servers store said data messages transmitted to the multicast group (page 5, right column, paragraph beginning "2. Timestamp dissemination step", lines 5-6), the multicast group further comprising checkpoint servers (referred to throughout the reference as "process"), the method further including the steps of step for message consolidation; step for garbage collection; and step for storing said first sequence number in stable storage (referred to throughout the reference as "history(p)" and "PPS(m)"; page 3, right column, paragraph beginning "SCALATOM"; page 5, left column, paragraph beginning "The sequence of pairs...").

Regarding claim 7, "SAM" discloses a method for processing data messages multicast to members of a multicast group, the multicast group comprising a sequencer (referred to throughout the reference as "process" or "sequencer"; page 6, right column,

paragraph beginning "Sequencer-site algorithms"), one or more clients (referred to throughout the reference as "sender"), one or more data servers (referred to throughout the reference as "group member" or "addressees" or "processes"), and one or more commit servers (referred to throughout the reference as "processes"), the method comprising the steps of each data server that receives said each data message requesting the sequencer to assign a sequence number, from a sequence of numbers allocated to the data messages, to said each data message, in response to receiving each data message; assigning a sequence number following all sequence numbers assigned prior to assignment of the sequence number to said each data message, in response to the sequencer receiving a first quantity of requests to assign a sequence number to said each data message said first quantity of requests being other than a majority of requests from the data servers; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

notifying the commit servers of each assignment, each notification identifying said each assignment by said each data message and the sequence number assigned to said each data message; each of the commit servers sending to the sequencer an acknowledgment of said each notification, in response to being notified of said each assignment, said acknowledgment identifying said each data message; committing said each assignment, in response to the sequencer receiving a second quantity of the acknowledgments identifying said each data message (page 3, left column, paragraph

beginning "The basic ideas of those protocols...", step 4; page 5, Figure 4, step 4; pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step"); and

informing the members of the multicast group of each commitment. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

Regarding claim 8, "SAM" discloses a method according to Claim 7, wherein the members of the multicast group deliver the data messages to their respective upper layer applications in order of progressing sequence numbers (referred to throughout the reference as "Uniform Total Order", particularly in Table 1 on page 4); (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

said data servers store said data messages transmitted to the multicast group; (page 5, right column, paragraph beginning "2. Timestamp dissemination step", lines 5-6)

further including the step of using a receiver driven, negative acknowledgment-based approach to improve reliability of delivery of the data messages. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

Regarding claim 9, "SAM" discloses a method according to Claim 8, wherein said each data message is associated with a unique message ID and is identifiable from its

associated message m, (referred to throughout the reference as "message m", "m" being the unique message ID or "sequence number")

the step of using further includes the steps of each member of the multicast group identifying gaps in a progression of sequence numbers known by said each member of the multicast group to have been committed to data messages received by said each member of the multicast group; if said each member of the multicast group does not know a first message m, said first message m being associated with a first data message, a first sequence number within one of said gaps having been previously committed to said first data message, said each member of the multicast group querying one of said commit servers to obtain said first message ID; and if said each member of the multicast group has not received said first data message, querying one of said data servers to retrieve said first data message. (page 1, right column paragraph beginning "To illustrate the interest..."; page 4, left column, paragraph beginning "Asynchronous system")

Regarding claim 10, "SAM" discloses a method according to Claim 8, wherein said each data message is associated with a unique message ID and is identifiable from its associated message ID (referred to throughout the reference as "message m", "m" being the unique message ID or "sequence number"), the step of using further includes the steps of:

each member of the multicast group identifying gaps in a progression of sequence numbers known by said each member of the multicast group to have been committed to data messages received by said each member of the multicast group; said

each member of the multicast group querying one of said data servers to retrieve said first data message. (page 1, right column paragraph beginning "To illustrate the interest..."; page 4, left column, paragraph beginning "Asynchronous system")

Regarding claim 11, "SAM" discloses a method according to Claim 10, further comprising the step of said sequencer periodically generating and sending heartbeat messages to the members of the multicast group, each said heartbeat message containing an associated largest sequence number, said associated largest sequence number being the last sequence number committed at a time substantially equal to a time (referred to throughout the reference as "timestamp") said heartbeat message is generated. (referred to throughout the reference as "history(p)" and "gossip"; page 5, left column, paragraph beginning "The sequence of pairs..."; page 6, footnote #5)

Regarding claim 12, "SAM" discloses a method according to Claim 8, further comprising the step for periodic message consolidation. (referred to throughout the reference as "history(p)" and "PPS(m)"; page 3, right column, paragraph beginning "SCALATOM"; page 5, left column, paragraph beginning "The sequence of pairs...")

Regarding claim 13, "SAM" discloses a method according to Claim 8, wherein the multicast group further comprises one or more checkpoint servers (referred to throughout the reference as "process"), the method further comprising the step of performing periodic message consolidation (referred to throughout the reference as "history(p)" and "PPS(m)"; page 3, right column, paragraph beginning "SCALATOM"; page 5, left column, paragraph beginning "The sequence of pairs...") by said checkpoint servers at message intervals determined through a common consensus protocol (page

5, left column, paragraph beginning "Consensus"; pages 5 and 6, "4. Potential predecessor set computation step", particularly paragraph beginning "Let history(p_i, n) denote...", lines 3-6), each message consolidation producing a checkpoint associated with said each message consolidation (referred to throughout the reference as "PPS(m)"), said checkpoint associated with said each message consolidation corresponding to a terminal data message (referred to throughout the reference as "history(p, SN(m))"), said checkpoint associated with said each message consolidation containing checkpoint information, the checkpoint information being sufficient for a first upper layer application of said upper layer applications to reconstruct a cumulative system state said first upper layer application would attain upon receiving said terminal message and all said data messages that preceded said terminal message. (pages 1 and 2, paragraphs beginning "In this paper, we assume..." and "To illustrate the interest of supporting..."; page 4, left column, paragraph beginning "Asynchronous system"; pages 5 and 6, "4. Potential predecessor set computation step" and "5. Delivery step")

Regarding claim 14, "SAM" discloses a method according to Claim 13, further comprising the step of said checkpoint servers periodically generating and sending checkpoint reports to said sequencer, each checkpoint report corresponding to latest checkpoint at the time said each checkpoint report is generated, said each checkpoint report identifying a sequence number of its corresponding terminal data message, said each checkpoint report carrying size data of the latest checkpoint. (page 5, Figure 4, step 5, particularly the line "when [history(p_k, SN(m)) received from a majority of local group]; pages 5 and 6, "4. Potential predecessor set computation step")

Regarding claim 15, "SAM" discloses a method according to Claim 14, further comprising step for synchronizing a first asynchronous upper layer process of a first asynchronous member of the multicast group with other members of the multicast group, said first asynchronous member not being said sequencer or one of said data or commit servers. (page 4, left column, "Asynchronous system")

Regarding claim 16, "SAM" discloses a method according to Claim 14, further comprising the step of synchronizing a first asynchronous upper layer process of a first asynchronous member of the multicast group with other members of the multicast group, said first asynchronous member not being said sequencer or one of said data or commit servers (page 4, left column, "Asynchronous system"),

said synchronizing step including the steps of said first asynchronous member retrieving a first checkpoint from said checkpoint servers; said first asynchronous process retrieving all committed data messages following terminal data message corresponding to the first checkpoint; delivering said first checkpoint to said first asynchronous upper level process; delivering said all committed data messages following the terminal data message corresponding to the first checkpoint to said first asynchronous upper level process; and said first asynchronous upper level process processing said delivered checkpoint and said delivered data messages to achieve a system state identical to system states of other members of the multicast group. (pages 1 and 2, paragraphs beginning "In this paper, we assume..." and "To illustrate the interest of supporting..."; page 4, left column, "Asynchronous system", specifically lines 9-11)

Regarding claim 17, "SAM" discloses a method according to Claim 8, wherein said each data message bears a corresponding logical timestamp, said logical timestamp including a most recent sequence number known to original sender of said each data message when said each data message was first sent. (page 5, Figure 4, step 5, particularly the line "when [history(p_k, SN(m)) received from a majority of local group]; pages 5 and 6, "4. Potential predecessor set computation step")

Regarding claim 18, "SAM" discloses a method according to Claim 18, further comprising the step of the data servers deleting said stored messages that have logical checkpoints older by a maximum logical lifetime number at the time of deletion than a most recent sequence number known at the time of deletion. (pages 5 and 6, paragraph beginning "The PPS(m) is computed...", lines 4-7)

Regarding claim 19, "SAM" discloses a method according to Claim 18, further comprising the step of the data servers deleting said stored messages that have logical checkpoints older by a maximum logical lifetime number at the time of deletion than a most recent sequence number known at the time of deletion. (pages 5 and 6, paragraph beginning "The PPS(m) is computed...", lines 4-7)

Regarding claim 20, "SAM" discloses a method according to Claim 14, further comprising the step of said data servers deleting the stored data messages that are older than the latest checkpoint. (pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step", lines 4-7 that begin "Note that it is trivial...")

Regarding claim 21, "SAM" discloses a method according to Claim 16, wherein the multicast group further includes stable storage writeable by said sequencer, said

method further comprising the step of said sequencer storing in said stable storage said assigned sequence number before said step of notifying the commit servers. (page 5, right column, paragraph beginning "3. Sequence number computation step", lines 4-7)

Regarding claim 22, "SAM" discloses a method according to Claim 8, wherein the multicast group further includes stable storage writeable by said sequencer, said method further comprising the step of said sequencer storing in said stable storage said assigned sequence number before said step of notifying the commit servers. (page 5, right column, paragraph beginning "3. Sequence number computation step", lines 4-7)

Regarding claim 23, "SAM" discloses a method for multicasting data messages to members of a multicast group comprising the steps of: transmitting a data message to the members of the multicast group; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 1; page 4, Figure 4, step 1; page 5, right column, paragraph beginning "1. Dissemination step")

requesting assignment of a sequence number to the data message; assigning the sequence number to the data message in response to a non-majority of requests from the data servers; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

sending notification of the assignment of the sequence number to the data message; sending an acknowledgment of the notification of the assignment of the sequence number to the data message; committing the sequence number to the data

message (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 4; page 5, Figure 4, step 4; pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step"); and

informing the members of the multicast group of the commitment of the sequence number to the data message. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 5; page 5, Figure 4, step 5; page 5, right column, paragraph beginning "5. Delivery step")

Regarding claim 24, "SAM" discloses a method according to Claim 23, wherein said step of requesting includes the step of sending a data report message identifying the data message; (referred to throughout the reference as "R-deliver(m)"; page 5, Figure 4, step 2, specifically the line "when [R-deliver$_j$(m)]")

said step of sending notification of the assignment of the sequence number includes the step of Submitting a commit submit message identifying the data message; (referred to throughout the reference as "history(p)"; page 5, Figure 4, step 4, specifically the line "send history(p_j) to local group")

said step of sending an acknowledgment of the notification of the assignment of the sequence number includes the step of sending a commit acknowledge message identifying the data message (referred to throughout the reference as "history(p, SN(m))"; page 5, Figure 4, step 5, specifically the line "when [history(p_k, SN(m)) received from a majority of local group"; page 6, left column, paragraph beginning "Let history(p_i, n) denote the subset..."); and

said step of informing the members of the multicast group of the commitment of the sequence number includes the step of sending a commit message identifying the data message to the members of the multicast group. (referred to throughout the reference as "deliver-in-order(SN(m), PPS(m))")

Regarding claim 25, "SAM" discloses a method according to Claim 24 wherein the data message is a first data message, the sequence number is a first sequence number and the method, further comprises the steps of: transmitting a second data message to the members of the multicast group; (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 1; page 4, Figure 4, step 1; page 5, right column, paragraph beginning "1. Dissemination step")

requesting assignment of a second sequence number; (referred to throughout the reference as "R-deliver(m)"; page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step"; page 5, left column, paragraph beginning "The sequence of pairs..."; page 5, right column, paragraph beginning "2. Timestamp dissemination"; page 6, footnote #5)

assigning the second sequence number to the second data message; wherein said step of sending notification of the assignment of the first sequence number further includes the step of sending notification of the assignment of the second sequence number, said commit submit message identifying the first data message also identifying the second data message. (referred to throughout the reference as "history(p)" and

"gossip"; page 5, Figure 4, step 4, specifically the line "send history(p_j) to local group"); page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, left column, paragraph beginning "The sequence of pairs..."; page 6, footnote #5; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

Regarding claim 26, "SAM" discloses a method according to Claim 23 wherein the step of assigning the sequence number to the data message is done in response to receiving a first quantity of the requests to assign a sequence number to the data message. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", steps 2 and 3; page 5, Figure 4, steps 2 and 3; page 5, right column, paragraph beginning "2. Timestamp dissemination step" and "3. Sequence number computation step")

Regarding claim 27, "SAM" discloses a method according to Claim 23 wherein the step of sending an acknowledgment of notification of the assignment of the sequence number is performed in response to being notified of the assignment of the sequence number to the data message. (page 3, left column, paragraph beginning "The basic ideas of those protocols...", step 4; page 5, Figure 4, step 4; pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step")

Regarding claim 28, "SAM" discloses a method according to Claim 23 wherein the step of committing the sequence number to the data message is performed in response receiving a quantity of the acknowledgments of the notification of the assignment of the sequence number to the data message. (page 3, left column, paragraph beginning "The

basic ideas of those protocols...", step 4; page 5, Figure 4, step 4; pages 5 and 6, paragraph beginning "4. Potential predecessor set computation step")

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C Neurauter, Jr. whose telephone number is 703-305-4565. The examiner can normally be reached on Monday-Saturday 5:30am-10pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on 703-308-5221. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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